

A Decade-Long Analysis of Food Marketing to Children via YouTube in Türkiye: Cross Sectional Study

Ayşe Tülay BAGCI BOSI¹, Sevilcan Başak UNAL²

¹Assoc. Prof., Hacettepe University Public Health Institute

²MD, PhD Candidate, Hacettepe University Faculty of Medicine Department of Public Health

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ABSTRACT

Childhood obesity is linked to children's exposure to the marketing of unhealthy foods and beverages. This study aimed to evaluate the marketing of unhealthy foods and beverages to children in most viewed advertisement videos broadcasted on the YouTube platform in Türkiye. The top ten most viewed YouTube advertisements given by YouTube Ads Leaderboard list in Türkiye for 56 months were obtained. 498 videos were evaluated using the WHO Regional Office for Europe Monitoring Food and Beverage Marketing to Children via Television and the Internet and the Nutrient Profile Model. Food and beverages was the most commonly advertised products (21.7%). The most frequently advertised food category was chocolate and sugar confectionery, energy bars, sweet toppings and desserts (17.6%), edible ices (16.7%), and savory snacks (14.7%). A child or child-like character used in 26.5% of videos. Children were targetted in 40.1% of evaluated videos. According to the WHO nutrient profile model, marketing was not permitted to children in 93.1% of advertisements. The lack of regulations for children on YouTube advertisements increases children's exposure to marketing of unhealthy food and beverages. Children should be protected from marketing of unhealthy foods and beverages in all platforms, including online marketing.

Keywords: Food Marketing to Children, YouTube, advertising, YouTube Ads. Leaderboards

INTRODUCTION

Childhood overweight & obesity is a public health threat that jeopardizes the health and well-being of children. While the prevalence of childhood overweight is increasing in all regions of the world, combatting childhood overweight is defined as one of the goal areas in Global Nutrition Targets 2030 by the World Health Assembly [1], in line with Sustainable Development Goal agenda that includes aiming for access to safe, nutritious and sufficient food by all people and ending all forms of malnutrition by 2030, including childhood overweight which affects 37 million children under five globally [2].

Proper nutrition is a right of children protected by the Convention on the Rights of the Child and nutrition is an indispensable component of essential health services [3]. Good nutrition requires a 'diversified, balanced and healthy' diet with taking the necessary nutrients in proper amount and variety according to the individual characteristics of the person [4]. To achieve good nutrition for all, awareness of healthy food choices and eating habits should start from childhood and continue throughout life [5].

While the primary motivation for eating is relieving hunger, paying attention and regulating the content, frequency, and quantity of the eaten foods and beverages is important. This requires individuals to be conscious and informed of how healthy eating should be. As psychosocial beings, individuals build their relationship with foods by starting with the guidance of the sensory organs and ending with the feeling of satisfaction. The attractive features of the products play a critical role in the selection of eaten foods. Feeding is also a function and regulator of social relations. Healthy nutrition means adequate and balanced nutrition for the individual, with the ideal weight for the body maintained and the person enjoying the eating process, distinguishing healthy nutrition from simply suppressing hunger [6].

Healthy nutrition, rooted in a set of conscious actions of the person, starts from the beginning of life and is determined by healthy feeding habits and food choices. Acquiring healthy eating habits in childhood and

adolescence enables children to have healthy growth and development, reaching their full potential and paving the way for life-long good nutrition [7].

Obesity, a type of malnutrition, occurs as a result of excessive food consumption and decreased physical activity, disrupting the balance of intake and use of nutrients in the body [8]. Today, the increase in overweight and obesity threatens the lives of millions globally. It is stated that an estimated 5 million noncommunicable disease deaths were caused by higher-than-optimal BMI in 2019. The increase in childhood overweight and obesity in recent decades is dramatic. From 1990 to 2022, among children and adolescents aged 5–19, the prevalence of overweight (including obesity) has increased from 8% to 20%, while obesity prevalence has risen from 2% to 8%. In 2022, an estimated 37 million children under the age of 5 years and over 390 million children and adolescents aged 5–19 years were overweight [9].

Türkiye is one of the countries with alarming overweight rates. According to the results of COSI-TUR 2013, 2016, and 2022 studies, the prevalence of overweight among 2nd-grade students in Türkiye was 14.2%, 14.6%, and 12.5%, and the prevalence of obesity was 8.3%, 9.9%, and 9.9%, respectively. The prevalence of obesity, including overweight, was found as 22.5%, 24.5% and 22.4%, respectively [10].

Overweight in children results from the interaction of the individual factors of the child and the surrounding obesogenic environment. Excessive consumption of ultra-processed, high-calorie foods containing high fats, sugars, and/or salt is a major driver of overweight in children [7]. It was observed that there is a link between childhood obesity and childhood media exposure with the influence of social media on dietary habits [11]. Food and beverage advertisements play an important role in increasing the consumption of the product by targeting the children who are more affected by advertising and packaging compared to adults [4].

One of the factors determining consumption patterns is food advertisements. The developments in technology and the economy are affecting consumers' decision-making and purchasing behaviors along with their lifestyles. It is becoming more difficult for consumers to choose between the ever-increasing and diversifying brands [12]. The main purpose of food advertising is to affect the consumer's brand awareness, brand preference, and food purchases. Food advertising is related to attitudes, preferences, and behaviors towards the advertised product [13]. There is significant evidence that preferences and eating behaviors are changed by exposure to food advertisements and branding. In line with this evidence, companies spend substantial amounts on advertising campaigns to promote sales to affect purchasing behaviors [14].

Children like advertisements seven times more than adults, and they pay close attention to what they see and remember more details than adults, including the advertising that are not targeted to them. 43% of school children accept what is said in advertisements as truth, 58% think that what is shown is real, and 20-22% accept all advertisements without question. As children age, the frequency of believing what is said and shown in advertisements decreases. Advertisements play a critical role in establishing the concepts of consumption patterns, brand loyalty, and purchasing models in children as potential consumers for the future. It was found that children have a say in approximately 43% of family expenses. The child persuaded by advertisements has risen to the position of the first-degree decision-maker in the family [15]. With special visual and audial effects, advertisements capture children's attention and direct their perceptions, causing the desire for consumption and the brand image to settle in their minds. Children are often the center of their parents' spending, and advertising has developed strategies based on this principle. Children have become the target audience and primary consumers of today's society [16].

The issue of nutrition and child health has gained a new dimension with commercials. Children who watch advertisements demand more unhealthy foods. In addition, having a toy or action figure appear in such advertisements allows children to identify it more easily [17].

With the increase in advertisements aimed at children, legal regulations have been made in Türkiye to protect children [18]. Companies in the Responsible Advertising Executive Board of the Advertisers Association in Türkiye signed the National Food and Beverage Alliance – Türkiye Commitment in 2018. Within the scope of the commitment, food and beverage companies will not advertise products that do not meet healthy nutrition criteria to children under the age of 12, will not encourage excessive consumption, will emphasize the importance

of adequate and balanced nutrition and an active lifestyle, and will develop formulations of existing products [19].

One of the developed marketing means is the marketing on internet-based social interactions known as Social Media Marketing, a new dimension of contacting with the consumer [20]. YouTube website, a significant field of social media marketing, is a video sharing platform including advertisement videos founded in 2005 and reached 2.5 billion global users in 2024 [21]. The platform receives more than 122 million visitors per day, with the highest percentage of users young people [22]. YouTube Ads Leaderboard publishes the top ten most watched ads each month globally and for countries [23]. According to the results of Türkiye YouTube User Profile Research-2016, 63% of people stated that they watched a video on YouTube that influenced their decision-making before purchasing the product, and 25% of these videos were video advertisements of the product on YouTube [24].

Advertising formats on YouTube have diversified over time. Today, the platform includes many different ad types in addition to the advertising videos brands upload to their own YouTube pages, including in-stream ads, in-feed video ads, YouTube Shorts ads, and more. YouTube offers audience targeting and content targeting services to brands who want to organize advertisement campaigns. These methods determine the desired audience for the video. Groups of people with specific interests, intents, and demographics, including age, gender, parental status, household income, shared traits, and custom affinity, can be selected [25, 26].

WHO Monitoring Food and Beverage Marketing Children via Television and the Internet document, together with the Nutrient Profile Model, was published by the WHO European Office in 2016 as an assessment tool on food advertising and its use in marketing food to children [27, 28].

The Vienna Declaration on Nutrition and Noncommunicable Diseases and Report of the WHO Commission on Ending Childhood Obesity recommend that Member States implement comprehensive programmes to increase the consumption of healthy foods and reduce the consumption of high-fat, high-salt, high-sugar (HFSS) foods and non-alcoholic beverages [5, 29]. WHO called on Member States to introduce comprehensive bans on marketing HFSS foods to children in all media, including digital, and to close legal loopholes. In addition, it is stated that monitoring is essential to take action against the marketing of foods where policies do not exist.

Monitoring Food and Beverage Marketing Children via Television and the Internet and the Nutrient Profile Model allow food and beverage advertisements on television and the Internet to be evaluated in terms of their effects on children and to examine the content of these foods and beverages, thus enabling decisions to be made as to whether advertisements are appropriate for children.

We aimed to assess the advertisements in the YouTube Ads Leaderboard Türkiye monthly list and evaluate the online marketing techniques of food and beverage advertisements according to the WHO Monitoring Food and Beverage Marketing to Children via Television and the Internet, and Nutrition Profile Model.

METHODS

This study is a web-based, cross sectional epidemiological study. The first 10 most viewed advertisement videos monthly listed by YouTube Ads leaderboards broadcasted on the online video sharing platform YouTube were evaluated in this study. Evaluated videos reached from the YouTube Ads Leaderboard Türkiye list, presented by Google website www.thinkwithgoogle.com, which shows the ten most viewed advertising videos per month since September 2014.

Our study was conducted to analyze the content of food and beverage-related videos published over a ten-year period. Using September 2014 as a starting point (the first month the YouTube Ads Leaderboard list was published for Türkiye), and every other month at a time, the lists of six months of every year from 2014 to 2024 were examined. In the months where the list was not available, additional months were included in the study. Lists for some months were not accessible and were excluded. A total of 560 videos, released over a 60-month span, were identified as the initial study population. Inclusion criteria required that videos be accessible and primarily focused on food and beverage products.

Of the 560 videos, 62 were excluded due to inaccessibility. An additional 390 videos were excluded because they featured content not related to food and beverage products, and 6 videos were promotional materials for supermarket chains. Based on these exclusion criteria, a total of 458 videos were removed from the sample. The final sample comprised 102 videos that met the inclusion criteria, all of which were analyzed for their content, themes, and relevance to food and beverage marketing. The videos were evaluated according to criteria set by WHO Regional Office for Europe Monitoring Food and Beverage Marketing to Children via Television and the Internet and the Nutrient Profile Model and a data collection tool was created for standard data collection purposes.

The nutrient content of the products directly promoted in the advertisements were collected from companies' official websites. If a company was advertised rather than a single product or if the video introduced more than one product, the product first seen in the advertising video was chosen (for the standardization) for evaluation of the nutritional content. The obtained data was evaluated using the SPSS 23.0 package. The distributions of the collected data were analyzed, and associations between related variables were assessed using non-parametric statistical tests. A Type I error probability of 0.05 was considered for all analyses.

RESULTS

Of the 498 advertising videos, food and beverages were the most commonly advertised products, consisting of 21.7% (n=108) of all advertisements. While 94.4% (n= 102) were advertisements directly promoting a food product, 5.6% (n=6) were supermarket chain advertisements. The most frequently advertised food category was chocolate and sugar confectionery, energy bars, sweet toppings and desserts (17.6%), edible ices (16.7%), and savory snacks (14.7%) (Table 1).

Table 1: Advertised food categories according to WHO Regional Office for Europe nutrient profile model

Food category (n=102)	n	%
Chocolate and sugar confectionery, energy bars, sweet toppings and desserts	18	17.6
Edible ices	17	16.7
Savoury snacks	15	14.7
Beverages - Other (Includes cola, sweetened beverages, mineral and/or flavoured waters (including aerated) with added sugars or sweetener)	14	13.7
Cakes, sweet biscuits and pastries; other sweet bakery wares, and dry mixes for making such	12	11.8
Beverages - Energy drinks	10	9.8
Ready-made and convenience foods and composite dishes	4	3.9
Beverages - Milk drinks	4	3.9
Yoghurts, sour milk, cream and other similar foods	2	1.9
Processed fruit, vegetables and legumes	2	1.9
Sauces, dips and dressings	2	1.9
Beverages - Juices	2	1.9

The most commonly used primary persuasive appeals in the evaluated advertisements were enjoyment & satisfaction (22.5%) and being fun (13.7%) and new product introduction (8.8%) (Table 2).

Table 2: Primary persuasive appeal used in the advertising videos according to WHO Regional Office for Europe Monitoring food and beverage marketing to children via television and the Internet

Primary persuasive appeal (n=102)	n	%*
Enjoyment/satisfaction	23	22.5
Fun	14	13.7
New product introduction	9	8.8
Health/nutrition	7	6.8
Taste	7	6.8
Premium/contest	7	6.8

Convenience	4	6.6
Humour	6	5.9
General superiority	5	4.9
Quantity	5	4.9
Energy	4	3.9
Offers choices/options	3	2.9
Unique	3	2.9
Other	5	4.9

*Percentages are calculated as row percentages based on the total number (n: 102).

Almost all videos used dynamic audio-visual components, brand logos, and images of products or packaging for marketing purposes. 32.4% used celebrity endorsers, while 26.5% used a child or child-like character to engage with the audience, and 10,8% presented premium offers for product promotion (Table 3). Out of 102 advertising videos, disclaimers were present in 25 videos, 8 of them used health claims and physical activity depicted in 8 videos.

Table 3: Power variables of the advertising videos according to WHO Regional Office for Europe Monitoring food and beverage marketing to children via television and the Internet

Power variables of the advertising videos (n=102)	Exist		Not exist	
	n	%*	n	%*
Dynamic audio-visual components	102	100	-	-
Brand logo	101	99.0	1	1.0
Image of product or packaging	101	99.0	1	1.0
Celebrity endorsers	33	32.4	69	67.6
Child or child-like character (other than brand equity/licensed character)	27	26.5	75	73.5
Links to social media platforms	27	26.5	75	73.5
Brand equity characters	9	8.8	93	91.2
Web address provided	14	13.7	88	86.3
Licensed characters	6	5.9	96	94.1
Premium offers	11	10.8	91	89.2

*Percentages are calculated as row percentages based on the total number (n: 102).

When the nutrient content of the advertised product was collected from the companies' official websites, it was seen that 66.7% presented info for total fat content, 56.8% for saturated fat, 59.8% for total carbohydrates, and 57.8% for total sugars. Half of the companies presented salt in their product, and 66.7% displayed information about total calories. However, only 3.9% displayed the non-sugar sweeteners. The content information of the products is presented in Table 4. HFSS products (high-fat sugar salt) are food and beverage products rich in fat, salt, or sugar, as defined by the nutrient profile. HFSS product advertisements are subject to restrictions, and HFSS advertisements directed to children under 12 years of age through their content should not include promotions featuring popular celebrities and licensed characters. While 96.1% of the products are categorized as processed foods, 97.9% of these belong to the ultra-processed food category.

Table 4: The nutrient content of the advertised food products evaluated per 100 grams.

Nutrient	n	Min-Max	Mean±S.Error
Total fat (g)	68	0.0 – 345.0	17.01 ± 5.14
Saturated fat (g)	58	0.0 – 22.8	5.43 ± 0.79
Total carbohydrates (g)	61	2.5 – 523.0	39.28 ± 8.67
Total sugars (g)	59	0.0 – 521.0	26.95 ± 8.82
Added sugars (g)	34	0.0 – 58.8	13.44 ± 3.01
Salt (g)	51	0.0 – 5.5	0.67 ± 0.13
Energy (kcal)	68	10.5 – 683.0	256.89 ± 25.65

When the advertisements were examined in terms of whether they were allowed to be marketed to children according to the WHO nutrient profile model, only 6.9% (n=7) of advertised products were permitted to be marketed to children, whereas 93.1% (n=95) were not permitted. The primary target audience was children in 57.1% of advertisements permitted to be marketed to children, while this frequency dropped to 13.7% in those not permitted. The presence of child or child-like characters was 85.7% in permitted advertisements, compared to 22.1% in not permitted advertisements. The frequency of health claims was 71.4% in permitted advertisements and 3.2% in those not permitted, and these differences were statistically significant ($p < 0.05$) (Table 5).

Table 5: Primary target audience, Health Claim Display, and Child or child-like character usage in the permitted/not permitted advertising videos

	Permitted		Not permitted		p
	n	%	n	%	
Primary target					
Children	4	57.1	13	13.7	0.014
Other	3	42.9	82	86.3	
Health Claim					
Exist	5	71.4	3	3.2	0.000
Not exist	2	28.6	92	96.8	
Child or child-like character					
Exist	6	85.7	21	22.1	0.001
Not exist	1	14.3	74	77.9	
Total	7	6.9	95	93.1	

According to the classification framework of the WHO Regional Office for Europe for monitoring food and beverage marketing to children via television and the Internet, the primary target audiences of the 102 analyzed advertising videos were as follows: In 23.5% (n=24) of the videos, adults were identified as the main target audience, while another 23.5% (n=24) targeted a general audience, including all age groups or families. Videos targeting both teens and adults accounted for 20.6% (n=21), and 15.7% (n=16) were specifically directed at teenagers. Children were the sole target in 8.8% (n=9) of the videos, whereas 7.8% (n=8) targeted both children and teenagers. This distribution indicates that the majority of food and beverage advertising videos were not explicitly targeted at children. However, a substantial proportion (32.3%) of the content was directed at young audiences, including children, teenagers, or both. This is noteworthy given the growing body of evidence suggesting that exposure to unhealthy food marketing during childhood is associated with poor dietary habits, increased consumption of high-calorie, nutrient-poor foods, and higher risk of overweight and obesity. The relatively lower proportion of advertisements targeting children directly (8.8%) may reflect increased regulatory awareness or self-regulatory efforts by advertisers. Nonetheless, marketing strategies that appeal to broader audiences - such as families or teens and adults - may still indirectly reach and influence children, particularly through shared media consumption environments.

These findings highlight the need for comprehensive monitoring frameworks and stricter regulatory approaches to limit children's exposure to unhealthy food marketing across all media platforms, including content not overtly designed for them.

DISCUSSION

The most commonly advertised product in YouTube platform was found to be food and beverages in this study. This finding was compatible with traditional media advertisements in Türkiye. A study evaluating the 84 hours of TV advertisements on Turkish television found that 29% of the advertisements were food related; of them, 45% were products other than essential foods and 33% were beverages [30]. In a study on children's exposure to TV advertising across different countries, 29.6 % of advertisements were for foods or beverages in Türkiye. The top five food and beverage categories were chocolate, sugar confectionery, etc. (20.7%), edible ices (18.8 %), mineral and sweetened beverages (14.1%), and 7.6 % (savory snacks, etc.). 78.6% were not permitted [29]. Our study presented a similar distribution of most commonly advertised food categories, while not permitted advertisements constituted 93% of all videos.

A systematic review of techniques for marketing food to children shows that the most commonly used methods are promotion, promotional characters, health and nutrition claims, use of taste themes, and emotional appeal created by entertaining content of the advertisement. Most advertising in food marketing involves marketing high-energy/low-nutrient foods and beverages to children, which is a leading cause of childhood obesity [32]. In this study, “Enjoyment/satisfaction” and “Being Fun” were the most commonly used techniques. “Celebrity endorsers” and “Child or child-like characters” were other powerful marketing strategies. Seeing familiar characters affects children's decision-making process about products. In a study conducted by Danovitch and Mills in the United States in 2014 on four-year-old children, 74% of children preferred a low-quality product with a familiar character to a high-quality product. In the control group of the same study (where a low-quality product without a familiar character was used), this frequency was 6% [33].

In another study conducted by Kotler and colleagues, it was stated that popular characters affect children's decisions. In this study, it was shown that when healthy foods are advertised with popular characters, children prefer these products significantly more than in advertisements without/without popular characters [34]. A study conducted by Boyland et al. in the United Kingdom demonstrates how persuasive variables are used to market food to children. Advertisements viewed on popular TV channels were recorded between 06:00 and 22:00 for two days each month. In these advertisements, healthy and unhealthy foods were evaluated according to their persuasiveness, prize/draw offers, use of promotional characters, use of famous characters, and website promotion. As a result, it was shown that persuasive marketing techniques were used in advertisements of unhealthy foods despite legal regulations [35].

Similar results were found in studies focused on digital platforms. In a study examining digital platforms in New Zealand, 81% of websites were found to be marketing unhealthy food and beverages. 85% of all food and drink company Facebook posts and YouTube videos were classified as unhealthy. Nearly 30% of YouTube videos for unhealthy food and beverages featured promotional strategies and 13% premium offers. 10% of Facebook posts and 13% of YouTube videos of unhealthy food and beverages used marketing techniques specifically targeting children and young people [36]. In our study, children were targeted in 40.1% of evaluated videos (23.5% all ages family, 8.8% children, 7.8% children and teens).

YouTube platform found to be an important influence on children's eating habits in the literature. In a study conducted in Australia, it was found that watching food brand video content on YouTube, purchasing food online, and seeing favourite food brands advertised online were significantly associated with a higher frequency of consumption of unhealthy foods and drinks after adjustment for age, sex and socio-economic status in children aged 10–16 years [37]. In another study from Brazil, where food advertising on YouTube channels was analyzed, general advertising was identified in 45.6% of videos, while food and food service advertising was present in 12.9% and 1.6% of videos, respectively. Food advertisements were mostly represented by ultra-processed products [38]. In another study examining the food-related appearances on child influencers on YouTube "made-for-kids" channels, Two-thirds of videos had at least one food-related appearance, including candy brands (42% of appearances) and sweet/salty snacks, sugary drinks, and ice cream (32% combined) [39].

According to the Turkish Food Codex Food Labeling and Consumer Information Regulation [40], the Ministry of Agriculture and Forestry uses some information when regulating the mandatory information rules required by the food information legislation as follows;

The identity and composition of the food, its properties or other qualities, Protection of consumer health and safe use of food, including information on health effects, especially the content that may be harmful to the health of certain consumer groups, safe use, storage, durability and the consequences and risks related to the harmful or hazardous content of the food.

In this study, 93% of advertisements were not permitted to be marketed to children. Another important finding of this study is that 96% of the products were under the HFSS category. It has been shown that 53% of food advertisements broadcast on Australian television channels were for HFSS foods, 17% were for confectionery and chocolate and 13% were for fast-food restaurant chains [41].

It is recommended that legal action be taken against food and beverage advertisements to children same time companies that make misleading statements when marketing food and drink to young people [42]. In the vast

majority of food advertisements examined, it was found that food companies did not make statements. Today, children as individuals and clearly reveal their own personalities and decisions at an earlier age are becoming more exposed to advertisements with the increase in digital communication channels. Children and young consumers have become the primary target audience of advertisements. Children spend more time in front of the television than they do reading or playing on average. Most of the advertisements directed to children are for food products, and these food advertisements can have a great impact on children. Among these advertisements, the food and beverage products that attract the most attention of children pose a threat to their health [43].

The Children's Food and Beverage Advertising Initiative, which started in the United States in 2006 and aims to promote healthy lifestyles and nutrition in children, is similar to the alliance signed in Turkey in 2010 and the National Food and Beverage Alliance – Türkiye Commitment, which will enter into force on January 1, 2018. However, it has been observed that the companies involved in this initiative continue their advertising and marketing, contrary to the commitment they signed. Therefore, it should be closely monitored whether the companies will show the necessary care to the articles included in the Türkiye Commitment [44].

CONCLUSION

According to the World Health Organization "Monitoring Food and Beverage Marketing Children via Television and the Internet", advertisements that are not permitted should not be allowed to be viewed by children.

Children can now easily access mobile devices regardless of age. Families should be more conscious about this issue, since this makes it easier for children to be exposed to advertisements on YouTube and other digital platforms. Children are affected by the messages of advertisements in social-psychological terms. The brand images and messages in advertisements are internalized by children. Therefore, the necessary inspections and regulations should be carried out to ensure that children are protected from marketing unhealthy food and beverages.

Today, highly sophisticated methods, including personalized contents and algorithm-driven video recommendations, are used by YouTube and other platforms to increase the children's attraction and exposure to advertisements. Significant research gaps remain in our understanding of how these digital advertising strategies influence children's consumption habits. Further research should focus on examining children's experiences, perceptions, and behaviors in relation to these emerging advertising methods. To this aim, qualitative and mixed-methods research are needed to provide an understanding of these marketing technologies, including experimental designs, focus group discussions, and content analyses. The future research should particularly focus on psychological and emotional marketing tactics to assess their impact on children's consumption patterns.

The content information and nutritional content of the products promoted in advertisements should be reported by the companies publicly. Advertisements of HFSS products and the platforms where they are published should be subjected to regulations to protect children from unhealthy eating habits and related childhood obesity.

Ethics Statement

All study procedures were in accordance with the Helsinki Declaration. Because no data was collected from individuals, Internal Review Board approval was not sought.

Conflicts of Interest

The author(s) declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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